

REMARKS/ARGUMENTS

In the Office Action mailed September 8, 2008, claims 1-10 were rejected. In response, Applicants hereby request reconsideration of the application in view of the amendments and the below-provided remarks.

For reference, claims 1, 3, and 8 are amended, claim 2 is canceled, and claims 11-14 are added. Claim 1 is amended to clarify the language of the claim. Claim 3 is amended to depend from only claim 1. Claim 8 is amended to correct a grammatical error. Claims 11-13 are added to recite limitations related to the doping concentration of the drift region. These claims are supported, for example, by the original language of claim 2, which is canceled, as well as by the subject matter described in the specification at page 3, lines 3-8, of the present application. Claim 14 is added to recite limitations similar to the limitations recited in claim 3, although depending from claim 11. This amendment is supported, for example, by the original language of claim 3.

Drawings

The Office Action states that new corrected drawings are required to clearly number or mark the limitation recited in claim 1 of “the base of each trench is filled with an insulator plug adjacent to substantially all of the length of the drift region between the body region and drain region.” Applicants appreciate the Examiner’s review of the claims language and the drawings.

Applicants respectfully submit that the indicated limitation is shown and marked in the drawings. In particular, as noted in the Office Action, the specification of the present application describes aspects of this limitation at page 2, lines 1-15 and page 2, line 31, through page 3, line 2 (paragraphs 7 and 11 of the corresponding published application). Within the cited description, the specification states that the plug may be a dielectric filler. Furthermore, referring to Fig. 1, the specification also describes an oxide dielectric filler 30 to fill the base of the trench 20. Page 5, lines 2-3. Hence, the oxide dielectric filler 30 of Fig. 1 is one example of a plug which fills the base of a trench, as recited in claim 1 of the present application.

Therefore, Applicants respectfully submit that the indicated limitation of claim 1 is adequately shown and marked in the drawings because the example oxide dielectric filler 30 is shown and marked in Fig. 1 of the present application. Accordingly, Applicants respectfully submit that the request for new drawings should be withdrawn.

Claim Rejections under 35 U.S.C. 102

Claims 1-10 were rejected under 35 U.S.C. 102(b) as being anticipated by Fujishima (U.S. Pat. No. 5,981,996, hereinafter Fujishima). However, Applicants respectfully submit that these claims are patentable over Fujishima for the reasons provided below.

Independent Claim 1

Claim 1 recites “a drift region of exclusively the first conductivity type adjacent to the body region” (emphasis added).

While the details of the specification are not read into the limitations of the claim, it may be useful to refer to the specification of the present application for a contextual understanding of the limitations recited in the claim. The specification of the present application describes an embodiment which uses a drift region of a single conductivity type. Page 2, lines 19-21. For reference, the drift region is between the body region and the drain region. Fig. 1, drain region 8, drift region 10, and body region 12. Also for reference, the conductivity types generally refer to n-type and p-type materials. Page 2, lines 28-30. In contrast to the embodiment with a single conductivity type, the specification notes that conventional reduced surface field (RESURF) transistors use a drift region which has stripes of both conductivity types. Page 2, lines 19-21. By manufacturing a device with a single conductivity type in the drift region, rather than multiple conductivity types in the drift region, the device is much simpler to manufacture. Page 2, lines 28-30.

In contrast to the indicated limitation of claim 1, Fujishima does not disclose a drift region of exclusively one conductivity type. Rather, the device of Fujishima clearly includes two conductivity types in the drift region between the base region (103) and the substrate (101). Fujishima, Fig. 1; col. 8, line 41, through page 9, line 5. Specifically,

the device of Fujishima includes a drift region with both a drift drain region (102) and an impurity layer (111). The drift drain region is an n-type layer. Fujishima, col. 8, lines 53-55. However, the impurity layer is a p-type layer. Fujishima, col. 8, lines 41-44. Thus, the region between the base region and the substrate includes both an n-type layer (i.e., the drift drain region) and a p-type layer (i.e., the impurity layer), so the drift region of the device of Fujishima includes multiple conductivity types. Hence, the device of Fujishima does not include a drift region with exclusively one conductivity type.

Therefore, Fujishima does not disclose all of the limitations of the claim because Fujishima does not disclose a drift region of exclusively one conductivity type, as recited in the claim. Accordingly, Applicants respectfully assert claim 1 is patentable over Fujishima because Fujishima does not disclose all of the limitations of the claim.

Dependent Claims

Claims 2-14 depend from and incorporate all of the limitations of independent claim 1. Applicants respectfully assert claims 2-14 are allowable based on an allowable base claim. Additionally, each of claims 2-14 may be allowable for further reasons, as described below.

In regard to claims 11-13, Applicants respectfully submit that claims 11-13 are patentable over Fujishima because Fujishima does not disclose all of the limitations of the claims. Claims 11-14 generally recites limitations related to a non-uniform doping concentration in the drift region. In contrast, Fujishima does not disclose a non-uniform doping concentration in a drift region. In fact, in the previous rejection of canceled claim 2, the Office Action did not attempt to cite a portion of Fujishima which might describe a non-uniform doping concentration in a drift region. Rather, the Office Action merely concludes that a lower doping concentration of the drift region adjacent to the body portion is purportedly inherent in the disclosure of Fujishima.

The MPEP states that the Examiner must provide rationale or evidence in order to show inherency. MPEP 2112(IV). More specifically, in relying on a theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the assertion that an allegedly inherent characteristic necessarily flows from the teachings of the cited reference. Id. Moreover, the MPEP states that the

possible occurrence of a result or characteristic is not sufficient to establish inherency of the asserted result or characteristic. Id.

Here, the Office Action merely provides a conclusion of inherency. However, the conclusion of inherency asserted in the Office Action is not supported by any rationale or evidence. Although the Office Action concludes that a lower doping concentration of the drift region adjacent to the body portion is allegedly inherent, the Office Action does not attempt to provide any rationale to explain why what specific teachings of Fujishima might form the basis for this assertion. More specifically, the Office Action does not attempt to explain how the disclosure of an n drain drift region having a specific surface impurity concentration and a specific diffusion depth might lead to the asserted conclusion of inherency. Additionally, the Office Action does not describe any facts or technical reasoning that would support the assertion of inherency. Moreover, the Office Action does not provide any extrinsic evidence to remedy this lack of rationale. In other words, the Office Action asserts the unsupported conclusion of inherency, without providing any rationale or evidence to show how the Examiner might have arrived at the asserted conclusion of inherency. Therefore, this assertion of inherency is improper and insufficient to support a rejection at least because the assertion of inherency is not properly supported by rationale or evidence, as required by the MPEP.

Furthermore, as a separate basis of traversal, it should be noted that the actual disclosure of Fujishima does not support the assertion of inherency because the actual disclosure of Fujishima describes the drain drift region has having a specific surface impurity concentration of $1.1 \times 10^{17} \text{ cm}^{-3}$. Fujishima, col. 8, lines 53-54. Fujishima does not describe multiple concentrations or a range of concentrations. Consequently, the explicit disclosure of Fujishima does not support the Office Action's assertion of inherency because the assertion is inconsistent with the actual disclosure of Fujishima.

Therefore, Fujishima does not disclose all of the limitations of the indicated claims because the assertion of inherency is inconsistent with the actual disclosure of Fujishima. Additionally, the assertion of inherency is improper because the assertion is not properly supported by rationale or evidence as required by the MPEP. Accordingly, Applicants respectfully submit claims 11-13 are patentable over Fujishima because Fujishima does not disclose all of the limitations of the claim.

CONCLUSION

Applicants respectfully request reconsideration of the claims in view of the amendments and the remarks made herein. A notice of allowance is earnestly solicited.

Respectfully submitted,

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